

# Arteficially Induced »Monovision« is Vitium Artis and in Reality Corresponds with the »Monofixation Syndrome«

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## ABSTRACT

*Monovision is a method, most frequently used, in correction of presbyopia, especially by beginning presbyops. These persons want to see well at distance and also for near without the usual changes of eyeglasses correction. Sometimes this method is also applied by myopia and pseudophakic eyes (pseudophakic monovision). In myopia and hyperopia the dominant eye is corrected for distance and non-dominant for near less correction. By monovision, especially induced by Lasik, conductive keratoplasty and contact lenses, we can decrease the important visual function, such as contrast sensitivity, stereopsis, confusion in the field of Panum's area and visual field, and for this reason we conclude that this method of arteficially induced monovision is professionally incorrect and presents a vitium artis in optometric's practice and corresponds with the »Monofixation Syndrome«.*

**Key words:** monovision, correction of presbyopia, distance and near vision

## Introduction

Today, in cataract surgery procedures, ophthalmologists prescribe a moderate myopia-inducing the pseudophakic monovision again and again<sup>1-4</sup>. But the number of clinical studies is very low and commercial profit is sometimes the leading reason. Several surgeons selected and excluded the patients with corneal astigmatism greater than 2 diopters, when strong ocular dominance is present in patients older than 60 years. Today optical materials and surgical procedure are so sophisticated that arteficial monovision can be applied in few patients cases.

## Method and Explanation

The basic of explanation the optics physiology of monovision is the physiological aspect of horopters space perception<sup>5,6</sup>.

Figure 1 presents new trigonometric construction of horopters presentation of the retina in space and vice-versa.

In this new definition of horopters, is definite trigonometric value of radius of horopter circle with correlation and determination in accommodation.

Calculation for the radius »R« equation :

$$\cos \alpha = b/c$$

$$b = PD/2$$

$$c = PD/2 / \cos \alpha$$

$$c = R$$

$$R = PD/2 / \cos \alpha, \quad (\text{Vojniković 2012})$$

In Fig. 1 the displaced horopter circle is visible by adjustment of one eye, the right, for near vision and left eye adjustment for distance vision. For both of them, the horopter circle has different accommodation and consequently variety of horopter's angularity and angle of disparity. Finally, this leads to the decrease of visual functions: contrast sensitivity, stereopsis, confusion of accommodation and the area of Panum's and visual field. Headache is frequently present. One problem is also night driving or drawing and reading fine print. Present comfortable of vision like the symptoms of »monofixation syndrome«.

# TRIGONOMETRICS DETERMINATION OF HOROPTER'S CIRCLE (By B.Vojniković,2012)

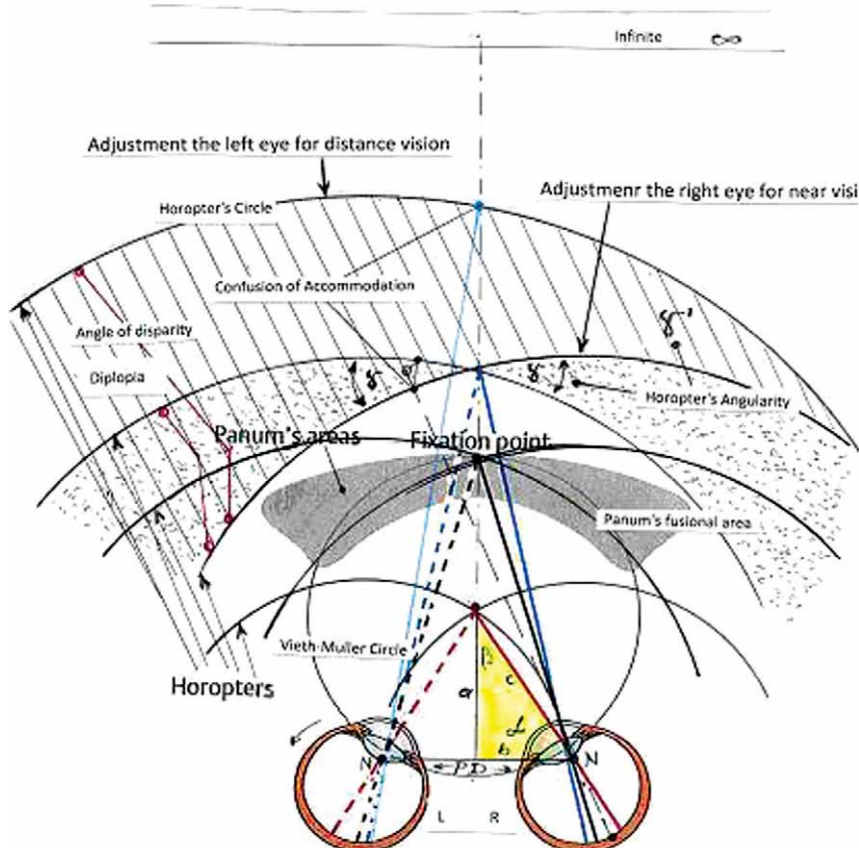


Fig. 1. Trigonometric horopter – This construction of horopter determined on equation definition of radius  $R$  curvature of horopter circle and accommodation of the eye. Contribution of this trigonometric horopter construction is the law of correlation between the horopter radius and accommodation of the eye. It's visible displaced the horopters circle of the left eye, adjustment for distance vision, lead to increased of horopters angularity ( $\gamma$ ), and consequently magnified the angle of disparity. All of this, lead to increased of confusion of accommodation.

## Discussion and Conclusion

The evolution of »Homo Sapiens«, from Hominidi, happened 4.5 million years ago. Through this long time of development, binocular vision was created as well as depth perception and stereopsis. In physiology of spheric retina, projection and space perception, determination of horopter's angularity and angle of disparity, Panum's areas<sup>6-8</sup>, normal accommodation of optical system, deter-

mines comfortability of vision. Arteficial monovision is applied in a very separate refraction cases with low different of refraction in binocular prescription. In all cases of eye refraction and prescribing or refractive surgery procedure, the most important is to satisfy of the comfortability of vision. I think, that this subject of monovision is very often an ophthalmologist's and optometrist's ethics problem and in some cases – »vitium artis«.

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## **UMJETNO STVORENA PREDNOST JEDNOG OKA-MONOVISION PREDSTAVLJA »VITUM ARTIS« I DIJELOM GRANIČI SA »MONOVISION SYNDROME«**

### **S A Ž E T A K**

Od prije tridesetak godina, točnije 1984., primijenila se monovision preskripcija kod pseudofakije. Danas se ta metoda primjenjene refrakcije, kada se jednom oku daje prednost na daljinu, kao dominacija, i drugom oku daje prednost na blizinu, dosta često upotrebljava: lasik, keratoplastike, pseudofakije ili kod uobičajene preskripcije, osobito u mladih presbiopa. Kod mnogih pacijenata zamijećene su smetnje: smanjenje vidnog kontrasta, dubinskog vida, nestabilnost akomodacije, konfuzija u području Panumove aree i angularnog dispariteta, kao i smanjenje vidnog polja i periferne diplopije. Kod nekih pacijenata se pojavljuje i glavobolja. Posebno je važno istaći, da ima velik broj zanimanja kod kojih je kontraindicirana ova metoda refrakcije, gdje se traži dubinski vid, dobar vid sa kontrastom, te ukupnost komfora vida. Kod nekih pacijenata ima i graničnih pojava sa »monovision syndrome«, kao blagi oblik neurastenije, slično kao »PC sindrom« kod predugog rada na kompjutoru. U svakom slučaju, razvoj vida u čovjeka pripremao se u dugoj evoluciji da stvori dubinski binokularni vid, i obaveza svih onih profila koji se bave refrakcijom oka, da to i izpoštuju. Osobno mislim da se ova metoda samo iznimno može promijeniti, i to sa vrlo malom binokularnom razlikom preskripcije. U većini slučajeva, refrakcijski postupak za »monovision« spada u etički problem, a katkada je i »vitium artis«.